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BOMBER DEPLOYMENTS: A NEW POWER PROJECTION STRATEGY

by

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This research project brings closure to a two and half year program. There were times when completion seemed in-probable. I would also like to thank my family and friends whose unwavering support helped my stay focused until completion. Lastly, a special thanks to my wife. As she battled a year long illness, her inspiration and strength were the cornerstone that kept me moving forward.

ABSTRACT

Throughout the past 15 years, the US military has rotated its forces to Iraqi and Afghanistan to take the fight to the enemy. These rotations have tested Air Force planners and the transportation system to move troops and cargo back and forth to the theater of operations. Operation IRAQI FREEDOM tested airlift capabilities when multiple services placed their requirements to move forces and equipment. This research paper explores AF policy that directs aviation units be able to deploy to a bare-base which requires units to maintain all of their UTC equipment. While this may provide greater flexibility for fighter aircraft units, this may not be an effective strategy for bomber units. The purpose of this study is understand current policy affecting the bombers and take a cross-disciplinary assessment of bomber aviation UTC capability requirements of deploying to a bare-base.

This research paper will use the evaluation framework and quantitative analysis to answer the research question, "How can bomber units improve response times and minimize costs when deploying to a forward operating location?" Significant costs are incurred when airlifting aircraft support equipment forward each time a bomber squadron is tasked to deploy. As the quantitative analysis shows, to move all of the support equipment for one bomber squadron can be expensive and tie up valuable cargo aircraft. Understanding the cost and aircraft airlift availability when deploying forces will help determine if there is a more cost effective method to deploy equipment required to support bomber forces.

INTRODUCTION

National security is endangered by an Air Force whose doctrine and techniques are tied solely to the equipment and processes of the moment. Present equipment is but a step in progress, and any air force which does not keep its doctrines ahead of its equipment, and its vision far into the future can only delude the nation into a false sense of security.[1]

General Hap H. Arnold, USAAF

Overview of the Study

Air Force Instruction 10-401, *Air Force Operations Planning and Execution* dictates that units must be prepared to deploy to bare-base locations worldwide while maintaining all of their UTC mobility equipment at their home station. These mobility deployment packages must be equipped to be self-sufficient to conduct warfighting operations. Additionally, Air Force Pamphlet 10-219, Volume 5, *Bare Base Conceptual Planning,* articulates the requirements for setting up a bare base. Preparing for deployment to a bare base requires significant site preparation, especially for bomber units due to footprint size and unique airfield requirements such as hardened aircraft parking aprons capable of handling pre-loaded rotary launchers (Figure 1), munitions delivery routes, and longer runways.

Figure 1.[2] B-1 Rotary Launcher on an MHU-196 Trailer

In some cases, bare-base locations may require units such as Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Red Horse to build the required infrastructure. This construction could delay aircraft deployments. While this strategy may work for fighter units, "deterrence requires that US forces be flexible, rapidly responding, precise with global reach. USAF activities during Operations ENDURING FREEDOM and IRAQI FREEDOM are examples of this conventional deterrent. In all cases where a mobile response was required, emphasis was placed on accelerated force projection and rapid initial beddown."[3]

History shows that AF bomber bases either deploy its forces from home station or deploy to a forward operating location (FOL) that contains the base infrastructure capable of supporting bomber forces. Preparing for a bare-base deployment drives a significant footprint of equipment at the home station. However, bomber deployment history does not support this concept of deploying to a bare-base, nor is it cost effective or strategically efficient to maintain mobility equipment at the home station. A 2006 RAND study on "US Global Posturing" contended that strategic evaluation should play a key role in basing decisions. The results of this study found that more should be done regarding forward basing strategies to increase the response time of deploying forces. The study also recommended "greater use of prepositioned equipment, strategically located and globally managed, will support training with our allies and partners and facilitate the rapid deployment of forces where and when they are needed." The recommendations from this study drive home the importance of FOLs and pre-positioning equipment to quickly prepare and respond to any contingency.

Few options are available to aviation units, deployment managers, and combatant theaters to minimize response times when deploying forces to an area of operation. These limitations can be attributed to the availability of airlift to move mobility equipment and personnel from home

station to the area of operation when tasked. To task units for deployment based on their capabilities, Unit Type Code (UTCs) are created to build a modular/scalable deployment package construct. These UTCs provide the documented and approved framework requirements for deployable manpower and equipment mobility package capabilities to support operations in a worst-case scenario, a bare-base. While other functional areas utilize the modular/scalable UTC process, for aviation units, these packages are structured on the number of aircraft deploying. For example, a lead UTC package for 12 aircraft would contain all of the required personnel (rank, skill level, and supervision) and support equipment to provide complete aircraft generation support for this lead package. When a unit deploys, these equipment packages must be moved via truck and airlift with the goal of arriving in the theater of operations when requested by the combatant commander. In the case of bomber units, these deployable equipment packages are large and very heavy requiring a significant amount of airlift. For example, a B-52 deployable squadron has 359 short tons of mobility equipment. Approximately ten C-17 cargo aircraft would be needed to move this equipment forward. Often, airlift is required when other Air Force units and services compete for the same airlift capabilities. For example, during Operation IRAQI FREEDOM, as a Functional Area Manager for Munitions, we had to coordinate a short notice B-52 deployment to Fairford Air Base United Kingdom. Airlift at the time was apportioned to support other movement priorities, and significant changes to equipment flow had to be made for the deploying unit. As a result, there were delays deploying this bomber equipment capability to the area of operations. If the bomber equipment was pre-positioned at the FOL, these delays could have been avoided.

Nature of the Problem

Air Force policy dictates that aviation units must be prepared to deploy to a bare-base which requires units to maintain all of their UTC equipment. While this may provide greater flexibility for fighter aircraft units, this may not be an effective strategy for bomber units. The 2002 RAND, study; "Reconfiguring Footprint and Expeditionary Forces" validates this viewpoint of FOLs and their role. This study found that the equipment and people required to support a combat deployment is simply very heavy. One main conclusion is the call for a "footprint reduction," i.e., "physically reducing the amount of material and personnel deployed to FOLs."[4] The study concluded that the AF "develop a comprehensive, parameterized list of UTCs needed to deploy a given force capability to a base with a specified infrastructure."[5] The study concluded that the AF should reduce the amount of personnel and equipment. However, the study does not offer ways to reduce the equipment footprint, specifically at bomber units. Furthermore, the study does not account for pre-positioning of deployment equipment.

In another 2013 RAND study by Stacie Pettyjohn "The Posture Triangle", highlighted the importance of FOLs in foreign countries to achieve operational objectives for the Air Force, especially the bomber force. The study determined that "FOLs are critical for ground forces and land-based air forces to generate and sustain operational effects during contingencies." However, this study did not explore how FOLs should be equipped to support aviation units.

Purpose of the Study

The purpose of this study is to add to current knowledge by assessing these research gaps and taking a cross-disciplinary assessment of bomber aviation UTC capability requirements of deploying to a bare-base. The first step will assess the total short ton weight of B-1 and B-52 UTC equipment that are currently maintained at home station. These two bomber airframes

were selected as a sample size for this evaluation assessment. Next, the research will evaluate the short ton weight and quantity of cargo airlift required to transport the equipment for one bomber squadron from home base to an FOL. The next step will look at the cost and requirements using civilian cargo airlift support. This evaluation will assess the size, weight, and amount of civilian cargo aircraft to move moving these packages to an FOL. The research will evaluate the cost and quantity of cargo aircraft for both military and civilian that is needed to transport UTC equipment from home station and if these assets are pre-positioned at an FOL. The research results may determine a need to change or revise Air Force deployment policy for bomber bases. Additionally, these changes may improve response times and provide a cost effective method to deploy bomber mobility equipment that can impact how related functional areas such as aircraft maintenance, weapons, and munitions deploy bomber UTCs.

Research Question and Methodology

This research paper will use the evaluation framework and quantitative analysis to assess the research question, "How can bomber units improve response times and minimize costs when deploying to a forward operating location?" The quantitative analysis will identify the short ton weight of a B-1 and B-52 mobility equipment packages and determine the quantity of cargo airlift aircraft to move this equipment from home station to an FOL. In the case of B-1s, the evaluation will assess B-1 bombers and all of the support equipment deploying from Ellsworth Air Force Base, South Dakota to Fairford Air Base, United Kingdom and to Andersen Air Force Base, Guam. The B-52 bombers and all of the support equipment deploying from Minot Air Force Base, North Dakota to Fairford Air Base, United Kingdom and to Andersen Air Force Base, Guam. While there are FOLs capable of supporting bomber operations, this research project uses these two locations to show a correlation between home station and current policy

and analyze if equipment was pre-positioned at an FOL. The analysis will compare these two bomber packages with the current state of positioning equipment at home station versus pre-positioning equipment at an FOL, in this case, Fairford Air Base, United Kingdom and Andersen Air Force Base, Guam. Answering this research question is important to understand if there is a more cost effective and efficient response method to move mobility equipment from home station to a theater of operations in United States Forces in Europe and Pacific Air Forces.

To assess cost-effectiveness to transport deployment packages from bomber bases, AFPAM 10-1403, Air Mobility Planning Factors, will be utilized to gain official cargo planning formulas to determine the number of cargo aircraft required to move equipment from home base to a FOL. Using these Air Force approved formulas shows a direct correlation between the number of aircraft and costs associated to move this bomber mobility equipment. While this is current AF policy, research will highlight a more efficient response time and cost effective method to deploy bomber mobility equipment from units located in the Continental United States (CONUS) to an FOL.

LITERATURE REVIEW

Overview

Primary and secondary sources will be consulted to understand the requirement to deploy bomber forces into a theater of operations. Three Air Force Instructions (AFIs) on policy that affect bomber deployments will serve as primary sources. These sources provide a clear picture for contingency response forces, mobilization planning and execution, base support and expeditionary site planning, and air mobility planning factors.

Primary Sources

AFI 10-401, Air Force Operations Planning and Execution, provides the framework and policy on UTC capabilities and deployment requirements. This AFI identifies the policy and procedures for all AF planning, operations, UTC construct, force modules, and how they are utilized. This AFI is applicable to all aviation units that deploy by providing guidance on how units and functional areas prepare to meet these requirements. Information contained in this instruction is crucial to answer the research question as it prescribes the foundation on how the AF plans and prepares forces for deployment.

AFI 10-202, Contingency Response Forces, provides the policy for Air Mobility Command, Combatant Commands, Air National Guard, Air Force Reserves, and supporting units that provide Contingency Response Forces (CRF) and equipment to support of air mobility operations. AFI 10-202 describes the policies and procedures to "Open the Base" for deploying forces to include bare-base locations.

AFI 10-404, Base Support and Expeditionary Site Planning, establishes the guidance, processes, and procedures for units and bases to prepare base support plans and expeditionary site planning and surveys. Aviation units that have a mobility requirement to either fight from home station, deploy forces to an FOL/base overseas, or receive forces are required to prepare base support plans and conduct site surveys. This instruction is a key document for this research project to understand these processes and how they interrelate to UTC deployment packages. For bare-bases, this data will provide planning factors that deploying forces need to be cognizant of during their preparation efforts. For FOLs, these documents provide a list of what is available and what type of resources that deploying units must provide when deploying.

AFPAM 10-1403, Air Mobility Planning Factors provides AF-approved cargo planning

formulas for determining the number of cargo aircraft needed to move cargo. These formulas will assist in determining the number of aircraft required to transport the total short tons of bomber mobility equipment from home base to and from the FOL. The information will contribute to the quantitative analysis in order to evaluate whether there is a cost-effective way to move deployment packages from bomber units to an FOL.

AFPAM 10-219, Volume 5, Bare Base Conceptual Planning, identifies the initial beddown and site planning, determining airfield requirements for bare base locations and FOLs. This pamphlet provides the bare base planning process and the timeframe to set up an air base.

AFPAM 10-219, Volume 6, Planning and Design of Expeditionary Airbases, provides deployment guidance that assists the engineers and logistic planners in developing and establishing Air Expeditionary Force airbases. The information contained in this pamphlet identifies the type of forces, equipment, and resources required to create and sustain support facilities ranging from a bare-base to an operational standard.

To assess the size, weight, and scope of UTC mobility equipment, the Manpower, Equipment, and Force Packaging (MEFPAK) database will be utilized to quantify the short ton weight of each UTC mobility equipment package required to support one bomber squadron. The MEFPAK database is used by all Functional Area Managers and deployment functions to gain access to UTC planning factors and cargo increments.

Secondary Sources

There are two RAND studies, the 2006 RAND study on "Transforming the US Global Defense Posture" and the 2013 RAND study titled "The Posture Triangle: A New Framework for US Air Force Global Presence" that provide a detailed unbiased assessment on the use and positioning of forces overseas. The 2006 RAND study on Transforming the US Global Defense

Posture is important to this research project because it provides the background on US world-wide strategic basing. The study also evaluates the posture of US forces during the cold war and highlighted the robustness of forward bases for US forces that were once a key aspect to our deterrence strategy. The study concluded by recommending that forward basing strategies to focus on improving response time by deploying forces and that more efforts need to rely on pre-positioning strategies. As a result, the information will provide essay on the global posturing strategies with US forces.

The 2014 Quadrennial Defense Review (QDR) provides Department of Defense (DoD) strategy to effectively implement and maintain a military commensurate to department budget constraints given the national security strategy. The QDR is revised every four years and is a key document for each service. For the AF, current and future budget constraints drive how the service is able to employ its forces to meet national security strategies.

The 2015 National Security Strategy (NSS) document lays out the framework on what's important to maintain and preserve national security. The NSS describes the principles and priorities that steer US national power and project influence throughout the world. Understanding the NSS and the direction is vital to this research project. For example, the ability of US forces to be able to project power through the deployment of bombers to FOLs is a key strategic option for the AF. The NSS also articulates deterrence strategies for US allies and reassure them that protecting their freedom and country sovereignty is important aspect in national strategy. One key strategy is the ability to rapidly project power forward when needed.

Another important study that relates to the research question is the 2013 RAND study "The Posture Triangle: A New Framework for US Air Force Global Presence." This study was chartered to answer three force posturing questions posed by the USAF Chief of Staff. These

questions focused on why the AF needs to assess its global structure, where basing needs are for the AF, and determine the optimal size AF overseas presence. The study results reaffirm the key role of FOLs in foreign countries in order to secure operational objectives for bomber forces. Moreover, the study identified FOL strategy importance and how vital FOLs are for land-based air forces. As a result, this study provides a critical assessment of AF global presence and offers crucial findings that support an FOL.

Tertiary Sources

There are two research journal articles that provide an unbiased assessment on the way the AF prepares and deploys its forces. The two journal articles discuss US strategies when deploying forces. One such article by Major Wade Karren titled "Long Range Strike: The Bedrock of Deterrence and America's Strategic Advantage," Air and Space Power Journal, June 2012. This article provides a different assessment of employing bomber forces and their deterrence ability. Long range strike assets such as bombers, Karren contends, are vitally important to the U.S. national strategy, specifically that forces should not be placed forward in harm's way but be able to respond to contingencies when called upon. Staging long range forces close to the conflict places them at a substantial risk. This article counters the concept of positioning mobility equipment at FOLs. Karren contends that the loss of secure global basing options and response time impacts create issues that long-range strike options will resolve.

This research project will also use an article written by Major General Charles D. Brown, Major General Bradley D. Spacey, and Captain Charles G. Glover titled "Untethered Operations: Rapid Mobility and Forward Basing are Keys to Airpower's Success in an Anti-access/Are-Denial Environment," Air and Space Power Journal, June 2015. Their research article focuses on the untethered approach for deploying aircraft and being able to land at austere locations

away from their deployed location for a quick pit stop for fuel and reload of munitions before taking off and going back on the offensive. Untethered Operations offers a new concept of projecting power forward. Bomber forces deploying to an FOL also benefit from their journal article and recommendations. As the authors note, forward basing is a key component to untethered operations in Europe because it increases basing options and reduces the logistics footprint. Furthermore, their research concludes that more should be done in pre-positioning war reserve materiel and positioning at the FOLs. This journal article stresses the importance of rapid mobility to achieve global objectives which are the foundation of this research project.

ANALYSIS

Preparatory Evaluation

To evaluate the research question and determine, how can bomber units improve response times and minimize costs when deploying to a forward operating location, an understanding of bomber operations, positioning of support UTC equipment and their deployment concept for potential deployment locations is needed. Often, the bomber force is the first capability tasked to project power from either home station or forward deployed at an FOL. This is further codified in the 2014 Quadrennial Review by "maintaining an Air Force with global power projection capabilities crucial for this updated defense strategy."[6] Bomber aircraft are usually first to be called to respond on short notice to achieve national security objectives. They may be tasked to fly from home station, strike and return, or deploy forward as a show of force. This can only occur if deploying to a main operating base or an FOL that is equipped to support bomber operations. Moreover, the 2015 National Security Strategy document prescribes "the central role of development in the forward defense and promotion of America's interests"[7] which the bomber units play a significant role in their ability to project power. The bomber force

provides a formidable deterrence strategy for US and its allies. But, if "deterrence fails, US forces will be ready to project power globally to defeat and deny aggression in multiple theaters."[8] How these forces prepare and have forward deployment locations available all contribute to the US deterrence strategy.

Additionally, a 2006 RAND study found that FOLs help minimizes deployment response times and AFs ability to project power. This study concluded that the US should "seek to maintain or upgrade—and in isolated cases establish—forward operating sites and cooperative security locations for rotational and contingency purposes, along with strategically placed prepositioned equipment."[9] To assess the deployment policy for bomber aircraft, a more efficient method to project bomber capability may provide a viable solution.

There are different types of bases that AF aviation units can deploy to in response to contingencies. For example, within expeditionary and long-term operations, there are four types of base camps: forward operating locations (FOL), forward operating base (FOB), main operating base (MOB) and intermediate staging base (ISB).[10] Each type of base requires certain actions to make it suitable for incoming aircraft. According to AFI 10-401, bomber units along with fighter aircraft units must plan for and be able to execute operations in a bare base location. Preparation at bare base locations can take considerable time and effort making the location ready for aircraft operations, especially for bomber units. Specifically, bomber units require more substantial infrastructure to conduct aircraft operations. In this case, a bare-base is the least desirable of the four types and takes the longest to establish and requires the most resources. As a result, delays could occur waiting for the bare base location to open before moving deploying bomber aircraft. For the purpose of this research, we will assess the bare-base requirements and the FOL. While bomber can fly and fight from home station, continuing to conduct these

operations will become costly regarding wear and tear on personnel and aircraft over the long haul. Placing bombers along with all of their support equipment closer to the fight greatly minimize the response times and shortens sortie productions rates or turn times. This increases the amount of bomber aircraft operating throughout the area of operations. But this only happens when all of the resources and equipment are in place. An FOL provides a viable option for rapid response and takes little effort to make operational.

The Air Force requires units to be agile when providing combat support which can be tailored to meet the Combatant Commander's tasking. To meet this capability, Agile Combat Support (ACS) "presents capabilities in a building block or modular/scalable approach, which prepares assets for the quick response and allows positioning of forces within the required response time."[11] To establish a bare-base, considerable planning, resources regarding heavy equipment, and site work needs to be accomplished by each functional area to set up the location and be prepared for incoming forces. Contingency site surveys are conducted during crisis action planning to identify data pertinent to the success of a given operation.[12] Additionally, other delays could hamper planning efforts to getting a bare base operational, especially if planning for a bomber base. As stated earlier, the construction of long adequate runway and hardened parking and loading aprons for bomber aircraft only add to these response deployment delays. Moreover, impact due to developmental delays is usually related to early-on, airlift-only logistics support for the forward location being dedicated to the joint operational support of other services, such as Army and Marine units and special operations forces.[13] As figure 2 depicts, it may take up to 14 days after establishing the location to get a base operational status.

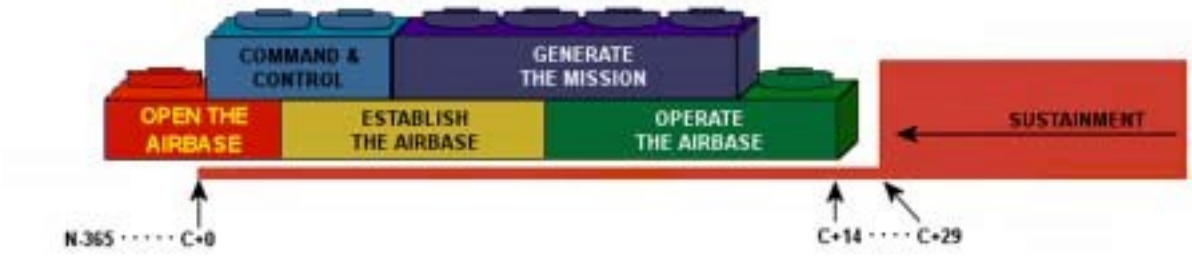

Figure 2. AETF Force Module Phased Deployment.

The Issue

Bomber UTCs are designed and equipped to support and sustain bomber operations in a "worst-case" scenario, a bare-base. A bare-base is defined as a base having minimum essential facilities to house, sustain and support operations to include (if required) a stabilized runway, taxiways, aircraft parking areas.[14] Focus on bare-base capabilities is due to the "shifting global geopolitical dynamics, closure of many main operating bases (MOB) overseas and the reluctance of many nations to permit permanent military bases on their soil."[15] This restriction leaves little basing options for the AF during contingency deployments. As a result, this situation increases the importance of the bare-base concept as a viable solution to contingency basing shortfalls and requirements.[16] However, this concept comes with a price and potential delays to deploy bomber units to their deployment location. Additional impacts such as Status of Forces Agreement between the US and the country receiving our forces could cause significant delays in moving US forces forward.

In order to meet bare-base deployment requirements, deploying units retain their UTC equipment at home station. In the case of bomber aviation units, the UTC should be able to perform its mission from a bare-base and must be able to combine with additional UTCs to meet requirements of bare base operations.[17] This requirement poses a real concern when moving bomber forces and support equipment to an area of operations. For example, UTCs that provide

direct aviation support include primarily maintenance and munitions UTCs.[18] These UTC packages are either stored at home station or put into "use" to accomplish daily flying operations. They include all of the support equipment, tools, and supplies to support the UTC package for 30 days. As a result, these UTC packages are large, heavy, and require a significant amount of airlift aircraft to transport these packages from home station to a deployment operating location.

Concept

The current Air Expeditionary Force (AEF) mobility concept is to deploy an expeditionary force rapidly, complete with facilities and related equipment, capable of independently supporting sustained combat operations.[19] For AF aircraft, there are hundreds of locations worldwide that can support fighter aircraft operations. The AF must have the capability to deploy to and operate from available locations regardless of the current infrastructure.[20] However, this is not the case for bomber units. Bomber aircraft require longer runways, hardened and reinforced parking aprons and loading areas capable of supporting loaded rotary launchers, and support heavy equipment such as the MHU-196 trailer. Furthermore, bomber units possess a significant footprint in UTC equipment. At the time of deployment, AF planners, and UTC Global Force Managers must work to de-conflict critical airlift availability to move these assets. This is an important point because it requires a significant amount of airlift to move these assets due to the current policy of bare-base deployment capability for bombers. Lack of available airlift will either cause delays in moving forces forward or impacting other services that rely on airlift to move their forces forward. Bomber forces deploying to an FOL require allies, strong support network, and viable forward basing options to conduct strike operations. If any one of the three networks is missing or incomplete, difficulties will occur sustaining long term operations.

The 2013 RAND study found that US forces need three components to support bomber operations. They are the strategic anchor, support linkages to support and sustain operations and an FOL to conduct operations. Figure 3 describes the global triangle concept and the requirements that support aircraft deployment operations.

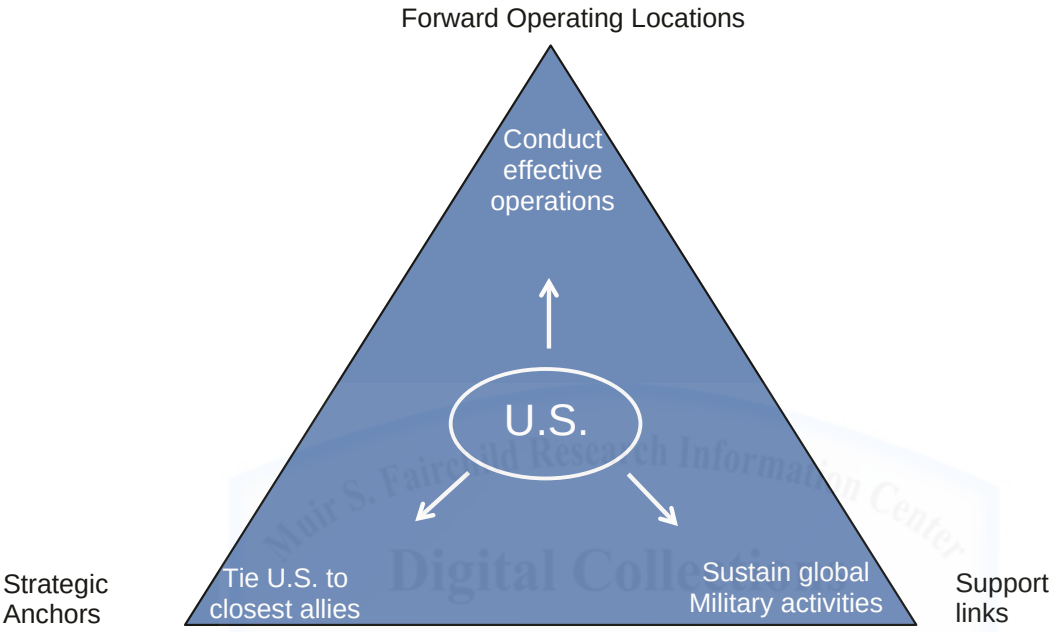

Figure 3. Global Posture Triangle, (Pettyjohn, xv)

The FOLs play an integral role and are dependent on their access by U.S. forces especially those locations that support bomber operations. So much so that the report contends that "future technological breakthroughs may change this conclusion, but aircraft expected to dominate USAF force structure over the next 20 to 30 years are highly dependent (either directly or indirectly) on access to forward facilities."[21] History also supports the fact that the AF relies more on bases or forward locations that it has access to versus opening new locations. Figure 4 below depicts the ratio of AF forward operational bases that either had no access or prior access during the last five major contingency operations. The data shows that accessible locations

remained fairly constant across the last five major contingency operations. The data shows that FOLs as a viable basing strategy continue to play a key role in forward deployment operations.

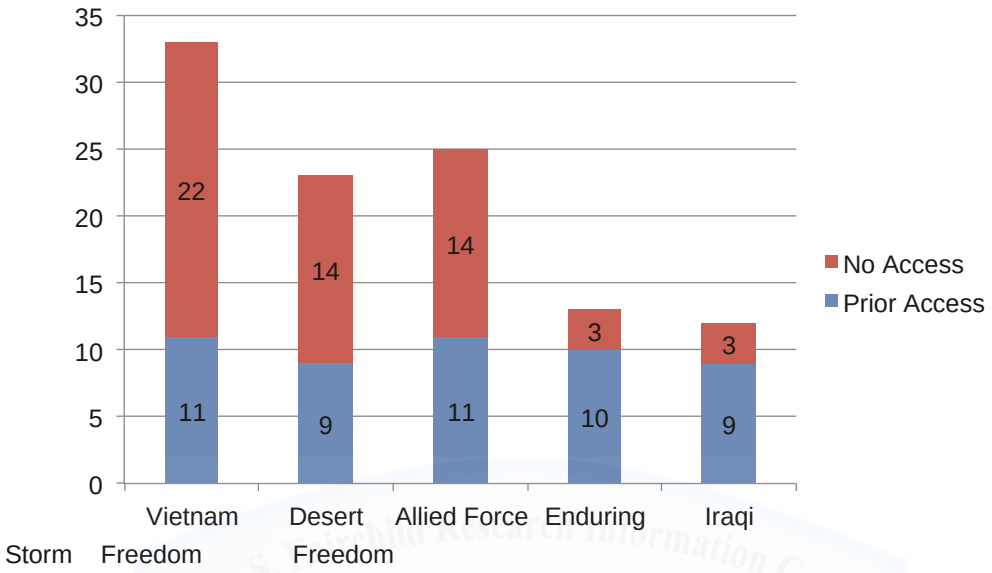

Figure 4. Airfields Used by the USAF During Five Major Combat Operations

Contending Proposals

One power projection concept that is gaining momentum and getting a serious look by senior leaders is untethered operations. Using the bomber deployment scenario of Fairford Air Base, U.K., as an FOL, there is concern that "advanced standoff weapons like Russia's pose major threats to the US and allied air force operations, especially as that country increases the sophistication of its integrated air defense and invests in ballistic missile systems."[22] Untethered operations contend that small robust aircraft packages be able to strike and land at other austere locations only to quickly refuel, reload munitions, and strike again. While this concept leverages on FOLs, it does not do so exclusively. Logistically, the "equation is basic: the more munitions and support equipment that can be stored at the forward location, the less the need to transport that materiel and the more flexible the options become."[23] This flexibility increases by the

number of options operational planners have when developing contingency operations and the flow of aircraft. Untethered operations concept focuses on these smaller aircraft packages leaving their main deployment location and conduct strikes against enemy targets only to land at interim locations to refuel and reload munitions for another strike. These smaller packages may not return to their main deployment location for quite some time. While untethered operations leverage on the FOL concept, it also acknowledges and adapts to flexible strike packages. However, this comes at a cost of predictability, personnel, and the ability to provide tailorable equipment to support such flexible operations simultaneously.

Another concept that challenges the forward deployment strategy is long-range strike (LRS). The basic premise of LRS is "using military power projection to influence the behavior of others."[24] This strategy uses LRS bombers and intercontinental ballistic missiles to either strike or deter aggressors from taking offensive actions. For example, if the mission is time sensitive, LRS bombers would leave from home station, fly to designated target, deploy its munitions and return back home. Having an LRS capability greatly reduces the reliance of forward basing strategies such as an FOL. In fact, "without an authentic LRS capability, the U.S. will become more reliant on other global basing options to project forcible power at shorter ranges. These basing options, however, will pose a substantial risk to U.S. and allied forces."[25]

Quantitative Analysis

To understand the size and scope to move a bomber deployment UTCs, let's look at the size, weight, and amount of cargo aircraft to move moving these packages to an FOL. This research project will assess the B-1 and B-52 deployment packages as a sample to show the amount of airlift resources needed to move this equipment. The type of airlift resources include the C-17 and commercial cargo aircraft. Although the C-5 is fully capable of transporting

mobility equipment, the difference in costs associated with the C-5 or C-17 are negligible. As a result, the C-17 capability will be used for this research.

The first analysis will begin with assessing the B-1 UTC that provides direct aviation support. They are the aircraft support, aircraft maintenance which includes specialists, back shop support, and weapons personnel. In addition to these requirements, there are munitions support packages which are also part of the direct aviation support UTCs. Each of these functions has deployment equipment capable of performing operations at a bare-base. Per AF policy, all deployment equipment is positioned at home station for deployment. The Manpower, Equipment, and Force Packaging (MEFPAK) database has the quantitative data that will be used to capture the short ton weight for each equipment package. The table below depicts the total short ton weight for each equipment UTC package that provide aviation support.[26]

B-1	**Functional Area**	**Total Short Ton Weight**
	Aviation Equipment	7.6
	Aircraft Maintenance	239
	Munitions Support	91.4
	Total Short Ton Weight	**338**

Table 1. Equipment Short Ton Table for B-1s

Using the C-17 airlift capabilities, the maximum cargo a C-17 can transport is 65 short tons of allowable cabin load.[27] If the cargo is oversized, additional C-17s would be required to transport all support equipment, thus adding to the overall costs. For the purpose of this research example, maximum transportable weight will be used to determine number of airlift aircraft. Given this formula, it would take six C-17 cargo aircraft to move 338 short tons of B-1 equipment from home station to the deployment location. This is a significant amount of dedicated airlift that must be apportioned to a CONUS B-1 bomber base. According to USTRANSCOM website, the

cargo rate to move one pound of equipment from Dover Air Force Base Delaware to Mildenhall Air Base, U.K. is $1.981.[28] Using the data in Table 1, the total cost to move 338 short tons or 676,000 pounds of equipment is $1.339.156 million. To move this same cargo weight from Travis Air Force Base, California to Andersen Air Force Base, Guam, the cost is $2.257 per pound.[29] Using this scenario, the total cost to move 338 short tons of equipment (all B-1 support equipment) is $1.525.732 million using today's DOD cargo rates. Again, these valuable airlift aircraft must be apportioned to move one B-1 squadron's support equipment to an FOL at time of deployment. At time of execution, airlift aircraft may not be available.

To assess commercial or non-DOD cargo aircraft, USTRANSCOM states the cost is $2.151 per pound for commercial cargo rates.[30] If DOD airlift is unavailable at time of deployment, the incurred cost is $1.454.076 million. Planners pursuing this option must gain pre-coordination and funds to use civilian cargo airlift.

The second quantitative analysis will assess the B-52 direct aviation support UTCs containing support equipment. B-52 UTCs are set up similar to that of the B-1 UTCs. As stated earlier, these UTCs contain all equipment to provide aircraft support, aircraft maintenance which includes specialists, back shop support, and weapons personnel. Furthermore, munitions support packages are also part of the direct aviation support UTCs. Each of these functions has deployment equipment capable of performing operations at a bare-base. These equipment packages are also positioned at home station for deployment and movement forward when tasked. The Manpower, Equipment, and Force Packaging (MEFPAK) database provides the quantitative data that will be used to capture the short ton weight for each equipment package. Table 2 depicts the total short ton weight for each B-52 equipment UTC package that must

deploy to provide direct aviation support.[31] A total of 359 short tons of equipment is required to support one B-52 squadron.

B-52	Functional Area	Total Short Ton Weight
	Aviation Equipment	4.2
	Aircraft Maintenance	245
	Munitions Support	110
	Total Short Ton Weight	**359**

Table 2. Equipment Short Ton Table for B-52s

Using the C-17 airlift capabilities, the maximum cargo a C-17 can transport is 65 short tons of allowable cabin load.[32] If the cargo is oversized, additional C-17s would be required to transport all support equipment, thus adding to the overall costs. For the purpose of this research example, maximum transportable weight will be used to determine number of airlift aircraft. Given this formula, it would take six C-17 cargo aircraft to move 359 short tons of B-52 equipment from home station to the deployment location. This is a significant amount of dedicated airlift that must be apportioned to a CONUS B-52 bomber base. According to USTRANSCOM website, the cargo rate to move one pound of equipment from Dover Air Force Base Delaware to Mildenhall Air Base, U.K. is $1.981.[33] The website does not account for deployment movement from home station to the deployment location. As a result, the estimated cost analysis shows movement from a major cargo hub such as Dover Air Force Base and Travis Air Force Base. Therefore, additional costing data to move equipment from Minot Air Force Base and/or Ellsworth Air Force Base would higher. Using the data in Table 2, the total cost to move 359 short tons or 676,000 pounds of equipment is $1.339.156 million. To move this same cargo weight to Guam, through Travis Air Force Base, California the cost is $2.257 per pound.[34] The total cost to move 359 short tons of equipment (all B-52 support equipment) is $1.525.732

million using today's DOD cargo rates. Again, these valuable airlift aircraft must be apportioned to move just one B-52 squadron's support equipment to an FOL.

To assess commercial or non-DOD cargo aircraft, USTRANSCOM website states the cost is $2.151 per pound for commercial cargo rates.[35] If DOD airlift is unavailable at time of deployment, the incurred total cost is $1.454.076 million to transport all aircraft support equipment. Planners pursuing this option must gain pre-coordination and sufficient funding and approval prior to using civilian cargo airlift to move aircraft support equipment forward thus leading to potential deployment delays.

If the AF remains with the bare-base policy for bomber units, significant costs and potential delays could occur. As noted in an earlier Operation IRAQI FREEDOM example, due to competing demands for critical airlift led to a lack of available airlift at time of unit deployment execution.

CONCLUSION

Deploying a squadron of bombers requires planning and execution strategy. Significant costs are incurred when airlifting aircraft support equipment forward each time a bomber squadron is tasked to deploy. As the quantitative analysis has shown, to move all of the support equipment for one bomber squadron can be expensive and tie up valuable cargo aircraft. The 2014 Quadrennial Defense Review (QDR) establishes priorities for the U.S. armed forces to be able to preserve peace and stability world-wide. The QDR identifies these "priorities include rebalancing to the Asia-Pacific region to preserve peace and stability in the region; maintaining a strong commitment to security and stability in Europe."[36] The ability to rapidly deploy a formidable bomber force to established FOLs provides a first choice option for planners. The importance of this capability is further codified in the QDR. In order to promote and secure

regional stability and access around the world, U.S. forces must "improve capacity, interoperability, and strategic access for coalition operations. Across the globe, we will ensure the access needed to surge forces rapidly in the event of a crisis."[37]

Air Force policy calling for aviation units such as bomber force to prepare and be able to deploy to a bare-base could be hard to achieve. While this policy promotes flexibility when deploying to a theater of operations, especially for fighter units, it is difficult for bomber units to achieve this same timely and flexible deployment strategy. As figure 2 depicts, getting a base operational could take up to 14 days. For bomber operations, hardened parking areas and aprons are required to support the movement and use of very heavy munitions loading equipment. Two RAND studies conclude that greater use of FOLs and pre-positioned equipment will enable rapid deployment of forces, notably, bombers. In fact, "greater use of prepositioned equipment, strategically located and globally managed, will support training with our allies and partners and facilitate the rapid deployment of forces where and when they are needed."[38] In most cases, these FOLs have permanent party personnel that can maintain this equipment. Furthermore, "to better prepare the USAF for potential operations across a wide range of scenarios, we recommend working with partner nations to identify and selectively develop FOLs."[39]

Alternate deployment and employment concepts are also emerging. For example, untethered operations is one such strategy that differs from exclusive reliance on FOLs. Untethered operations is gaining momentum by offering a strategy that uses a small forward basing strategies to support smaller number of aircraft. These smaller, less permanent infrastructure forward basing locations would be equipped with sufficient support equipment, munitions, and fuel to re-load aircraft and take off again for another strike mission. Unlike an FOL that is equipped for launch, recover, and sustainment of aircraft operations. One important

note about untethered operations, these smaller packages may not return to their main deployment location for quite some time. While this deployment and employment strategy is available option for fighter aircraft, it would not work for bomber aircraft.

Another strike strategy that is gaining support is the Long Range Strike (LRS). LRS strategy uses bombers and intercontinental ballistic missiles to either strike or deter aggressors from taking offensive actions. In effect, the strategy keeps forward basing bombers and fighter aircraft out of harm's way in a highly contested airspace due to anti-access/anti-denial impacts from enemy forces. While this strategy may be effective early on in a contested airspace, AF strategy is to achieve air superiority and be able to operate its forces across the full spectrum of their capabilities. As stated earlier, if the mission is time sensitive, LRS bombers would leave from home station, fly to designated target, deploy its munitions and return back home. Having an LRS capability greatly reduces the reliance of forward basing strategies such as an FOL. In fact, "without an authentic LRS capability, the U.S. will become more reliant on other global basing options to project forcible power at shorter ranges. These basing options, however, will pose a substantial risk to U.S. and allied forces."[40] However, LRS strategy would be difficult to sustain long term combat operations and would become very costly.

RECOMMENDATION

According to the evaluation quantitative assessment, there is opportunity for bomber units to improve response times and reduce costs when deploying. It is without question that bomber forces ability to rapidly generate and project power forward is a key aspect of US national security strategy. As the quantitative analysis results reveal, the cost to move equipment and apportion airlift aircraft can be expensive and resource intensive when moving bomber forces forward. Bomber forces form the pillar of strategic deterrence capability for the US and

its allies. Bomber bases in the US have the equipment, vehicles, and personnel to generate and load aircraft to leave from home station, strike selected targets, and return home. These forces have the capability to continue home base strike missions as needed. A capability that is currently present at all bomber units.

To strengthen the power projection, maintain home station strike capability, and do so in a cost effective and utilize the fewest amount of airlift resources is by moving UTC equipment to forward operating locations. At the time of deployment execution, to move one bomber squadron to a FOL will require at least six C-17 cargo airlift aircraft. If two bomber units move simultaneously, TRANSCOM and mobility planners will need 12 cargo aircraft at a time when other services are competing for valuable airlift to move their forces forward. Moreover, the cost to move this equipment forward is significant. As the quantitative analysis shows, the cost to move equipment for two bomber squadrons is approximately $3 million. To alleviate this cost and the impact to dedicated airlift, changes need to occur. The research contends that this impact is simply not necessary if the AF changes its bomber UTC capability strategy from a bare-base deployment concept to one of an FOL. Pre-positioning all of the bomber deployment equipment at the FOLs such as Fairford and Guam is not only cost effective, but will reduce the significant burden of airlift sourcing. Most FOL locations have the base infrastructure and permanent party personnel to maintain this equipment, therefore, a pre-positioning is nearly transparent. Furthermore, bomber units will be able to forward deploy more rapidly because they only need to move personnel forward. The RAND study on the "U.S. Global Defense Posture" by Ryan Henry drive home this point by stating that "greater use of prepositioned equipment, strategically located and globally managed, will support training with our allies and partners and facilitate the rapid deployment of forces where and when they are needed."[41] The 2015 National Security

Strategy (NSS) document also reinforce this point for both the Asian and European theaters. "To realize this vision, we are diversifying our security relationships in Asia as well as our defense posture and presence."[42] Bomber forces are a key part of this strategic deterrence and ability to project forces forward. Additionally, projecting forces forward is also an integral part of US national strategy. According to President Obama in his 2015 NSS document, the US will reassure "our allies by backing our security commitments and increasing responsiveness through training and exercises, as well as a dynamic presence in Central and Eastern Europe to deter further Russian aggression."[43] Again, the rapid response and deployment of bomber forces provides this capability and assurance to US allies.

Another notable forward projection strategy that should be part of the solution is the Long Range Strike (LRS) concept as described by Major Karren. A LRS capability also provides a strong deterrence strategy for the US. The LRS concept plays a pivotal role in the AFs new long range bomber (B-21) development. As the research results reveal, LRS capability must be considered by AF leaders and strategists. As the anti-access, anti-denial impacts become more and more prevalent within a theater of operations, the ability to project power from home station is important. Again, bomber units currently have this capability at their home station, so no change in employment concepts need to change.

However, it is time to change the AF policy of bare-base deployment concept for bomber units and deployable UTCs. There is no need for bomber units to maintain home station equipment, vehicles, and all of its UTC based mobility equipment. To offer a cost effective deployment strategy that improves response times as the research contends, the AF should move all UTC bomber deployment equipment from all bomber units and pre-position it at the FOLs. A

fully equipped FOL brings improved bomber deployment response force and is cost effective solution for the AF during bomber deployments.

Endnotes

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